REMARKS

In regards the limitation "the expected unenergized state" in claims 1, 5 and 12, the new claims have been amended to state that transducers can cause the device the control scans to operate in a hazardous manner. The specific hazard depends on the type of transducer and what it operates in the device. Claims 22-24 narrow what is meant by hazardous manner based on the type of transducer.

The limitation that the transducers are not hazardous when unenergized excludes transducers that must function as intended to be safe. Items such as the pumps keeping patients alive in the hospital. The control operating the pump can't simply turn off the pump if there is a fault in the switching used to control the pump and expect the patient not to be harmed. Motors actuating the flaps on a plane are another transducer that can't be shut off when the plane is operating without putting the plane and pilot in jeopardy.

The term "otherwise" has been removed. The invention tests the switches in a device to insure that the switches carrying transducer current are in their intended state. To do this the control must know the state of the switch by some other means than the scan of the energizing circuit. The claims have been rewritten to state that the intended states are known to the control. Either the control sets the intended state or when an override determines the intended state the override must signal the control the state the override expects the switch to be in.

With respect to the rejections based on Barnett, the inventions are similar. Both inventions attempt to prevent hazardous operation. Further in cases of devices posing potential physical harm to the operator an interlock and an override could be the same thing. However the switches scanned by the present invention are those in the energizing transducer circuits, the switches scanned in the embodiments in Barnett are not in the energizing transducer circuits, rather the Barnett switches are inputs to a control.

The new claims include the limitation that the switches and transducers are in an energizing circuit, rather than energizing circuitry which is vague. Further the claims now state that the energizing circuits carry the current that energizes the transducers. This is not the case in Barnnett as the scanned switches are inputs to the control. Barnett switches do not carry transducer current.

Barnett does teach opening a transducer switch, the main disconnect, to turn off the transducers if a fault is found. However the functionality of the main disconnect is not scanned to verify it is in its intended state, were the main disconnect to fail a Barnett control would not detect the failure or be able to do anything about it. Even if Barnett were to open two switches in the transducer circuit, failure of both switches, even years apart, could still cause hazardous operation as the switches are not tested and the first failure would not be detected.

The present invention tests and verifies the switches in the circuit used to energize transducers. If a switch failure is found, another switch that has been tested and found to be functional, is used to turn off the transducers. These switches are the most likely to fail and the most expensive components in many controls. The present invention seeks to minimize the cost while ensuring safety.

In the present invention as long as one switch in the transducer circuit is functional hazardous operation caused by load switch failure is prevented. For hazardous operation to be caused by load switch failures multiple failures would have to occur virtually simultaneously. Further anything protected by an override is safe unless the control and the load switch operated by the override fail simultaneously. Prior approaches rely on many untested switches to render a device safe. Safety is generally maintained until multiple failures occur, however failures go undetected by the device. The present invention allows the use of fewer switches while maintaining safety. Barnett does not teach the testing of any switch in the energizing circuit, it assumes the main disconnect is functional.

The intended state of the switches scanned by the present invention are known whether set by the control or an override. The only time a Barnett control knows the intended state of the interlock is when the control activates its testing procedure. What happens in a Barnett control if the interlock fails between the last test and when the interlock is opened by the operator? The interlock would not stop the machine and the control will not be able to stop the device to prevent injury as it is unaware of the intended state of the interlock. Conversely an override itself is not tested by the present invention as is the case with Barnett. The present invention just tests that the load switches are in the state as set by the control or override. If the override is faulty it would go unnoticed by the teachings of the present invention.

Turning to the rejections by claim. The present invention scans the energizing circuit of the transducer. The word circuitry has been replaced in claims 1 and 5 with circuit. Further the claims state that energizing circuits contain the transducers, switches and carry transducers

current. The switches tested in Barnett are not in the energizing circuit, they do not carry the current to energize the transducers.

Yes the interlock switch in Barnett can be identified as functional or non-functional as the present invention does with the transducer switches. However the transducer switches mentioned in Barnett, main disconnect and emergency stop are not tested and hence are not identified as functional or non-functional.

In regards to the rejections of claims 2 and 11 Barnett does not scan the energizing circuit of transducers. It can not use a scan it doesn't perform to determine the state of an externally operated switch in the energizing circuit of the transducers. While the switches in col. 12 ln.32-40 can be externally operated they are inputs to the control they do not carry the current used to energize the transducers and hence are not the external switches in claim 22 and 31.

Claim 3 and 12 use one sensor to scan a multiple transducer circuits. First Barnett does not scan transducer circuits. Second while there are multiple switches scanned in fig 1 #12a-n, each switch is read by a separate control input or sensor.

Claim 4 and 7 both inventions can signal that a fault has been found. It is the type of fault that is detected and signaled that differentiates Barnett from the present invention. Barnett tests switches that are inputs to a control and the present invention tests switches that are outputs of the control.

Claim 5 the backup of Barnett is a bypass letting the device continue to operate when an interlock would otherwise stop the device. The backup, term now eliminated in claim 25, was/is a functional transducer switch that would open the transducer circuit any time the intended state of the erroneously closed switch was open. The bypass of Barnett and using a functional switch to open the circuit when an erroneously closed switches serve opposite purposes. The bypass of Barnett allows continued operation and the backup or functional switch stops transducer operation.

Turning to the rejections based on Holling, Holling is attempting to determine the time delay between the time the control turns on the circuit driving the relay and the actual closure of the relay points. The object is to sync the relay with the ac zero crossing. To determine when points close a sensor reacts to the movement of the relay points or the arc produced when the points

close. The sensor does not scan the output circuitry used to energize a transducer; rather it detects physical movement or RF(arcing).

In view of Holling, the term circuitry in Claim 12 of the present invention was vague. Claim 32 states that it is the output circuitry used to energize transducers that is scanned to ascertain the frequency at which the monitored switch is changes state. The Holling sensor does not scan the output circuitry used to operate the transducers.

Further Holling is not concerned with the frequency of switching just the delay between the signal to close and closure. The frequency the relay changes state could be once a second or once a week, it does not matter to a Holling control. The present invention determines the frequency at which a monitored switch changes state. If this frequency becomes too high (typically 3 times a minute from a relay switching the motor in a washing machine) a control of the present invention will prolong the time the relay is open - lowering the frequency.

Also included are a marked and clean version of an amended page 2 of the original specification. In line 19 there is an extra "or" it has been marked and removed on the pages. Second there is an amended Figure 3. Inadvertently the graphs in the figure were labeled 2A-2C instead of 3A-3C as they are described in the embodiment. Please amend the specification to include the corrected text and figure.

Finally there is a signed statement stating that there is no new matter in the amendment.

In view of the amendments and these remarks, the applicant respectfully submits that the present application is in condition for allowance. A notice to that effect is earnestly and respectfully requested.

Respectfully submitted,

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Included are new claims 21-40 for application 10/082,454, marked and clean versions of an amendment to page 2 of the original specification, amended Figure 3 and remarks addressing the non-final office action. Also included is this signed statement. I hereby declare that said substitute specification contains no new matter.

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There are a total of 13 pages

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